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NOTES ON MYRIAPODS FROM DOUGLAS LAKE, MICHIGAN.

BY RALPH V. CHAMBERLIN, CAMBRIDGE, MASS.

The Chilopods and Diplopods here listed and described were all collected near the University of Michigan Biological Station at Lake Douglas, Mich., during July and August, 1913, by Mr. G. F. Sutherland, by whom they were sent to the writer for identification. All the specimens were taken from decaying logs.

The new *Nampabius* is represented by numerous individuals of both sexes. It is the largest known species of the genus and is geographically the most remote from what seems to be the centre for the group. Its habits would seem to correspond with those which I have noted for various other species in the genus, these having similarly been taken in greatest abundance under the bark of decaying logs.

Judging from the number of individuals in the collection, the new *Parajulus* is much the most common species of the genus occurring in the decaying logs at Douglas Lake. It is a strongly marked species, easily distinguishable from others known to occur in the region.

Class CHILOPODA.

1. *Geophilus rubens* Say.

This widespread species, at once distinguishable from others of the region by the characteristic geminate black stripe along dorsum, is represented in the collection by numerous specimens.

2. *Linotænia chionophila* (Wood).

Also a very common and widespread species in the Northern United States and in Canada. In the collection are three adults and three very young specimens.

3. *Bothiopolys multidentatus* (Newport).

A species common throughout the Middle Western and the Eastern States. Many specimens.

4. *Nadabius iowensis* (Meinert).

A species very common in the Middle West. About a dozen specimens.

5. *Sonibius bius* (Chamberlin).

Previously known from Saunders in the upper peninsula. Two specimens.

6. *Nampabius michiganensis*, sp. nov.

Dorsum from light brownish yellow to brown of dilute chestnut caste, the caudal plates commonly darkest. Head darker, more distinctly chestnut. Antennæ like head; the colour becoming denser and more reddish distad. Prosternum and prehensors somewhat lighter than head, but decidedly darker than venter, which is yellow or brownish yellow and darker caudad or usual. Caudal legs darkest.

Body conspicuously narrowed cephalad from eighth plate. Widths of head and of first, third eighth, tenth and twelfth plates to each other as 47: 41: 45: 56: 55+; 54.

Head slightly wider than long (47:45) comparatively rather wide cephalad. Caudal margin mesally incurved. Two short longitudinal furrows on caudal portion, these moderately diverging cephalad.

Antennæ short, but somewhat longer than in most related species. Uniformly and considerably attenuated distad, the terminal portion slender. Articles freely joined; sides straight; short, decreasing regularly from the second distad. Ultimate article distinctly shorter than the two preceding together.

Ocelli mostly 10 to 12 in 3, or, less commonly, in 4 series; e.g., 1+4, 4, 2; 1+4, 4, 3; 1+1, 4, 3, 2, the ocellus of the top row in this case being at anterior end of patch. Single ocellus much largest, the others decreasing regularly and considerably cephalad. Organ of Törnösvary in outline small; below anterior end of eye patch.

Prosternal teeth acute, subequal, sides straight, the interval well rounded; line of apices recurved. Sinus wide at bottom as usual; its sides rather long, moderately converging. Sides of anterior portion of prosternum straight or nearly so, slanting directly from spine, 1.47 times wider than long in type. Distance between chitinous spots 2.57 times width at level of bottom of sinus, 4 times the dental line.

First dorsal plate in type 1.64 times wider than long. Eleventh and thirteenth plates, but especially the latter, with posterior angles very slightly produced as usual.

Coxal pores mostly 2, 3, 3, 2; 2, 3, 3, 3 or 3, 3, 3, 3.

Spines of the anal legs, $\frac{0,0,2,0,0}{0,1,1,1,0}$; claws 2; of the penult, $\frac{0,0,2,0,0}{0,1,1,1,0}$; claws 2; of the thirteenth, $\frac{0,0,2,1,0}{0,0,1,1,1}$; of the twelfth, $\frac{0,0,2,1,1}{0,0,0,1,1}$ or $\frac{0,0,2,1,1}{0,0,1,1,1}$; of the sixth to eleventh, $\frac{0,0,0,2,1}{0,0,0,1,1}$; of the third to fifth, $\frac{0,0,0,1,1}{0,0,0,1,1}$; of the second, $\frac{0,0,0,0,1}{0,0,0,0,1}$; of the first, $\frac{0,0,0,0,0}{0,0,0,0,0}$.

Claw of the female gonopods of the usual tripartite form, the teeth acute, the median longest and the lateral subequal. Basal spines decidedly broader than usual, much as in *Tidabius*, those of each pair close together; moderately long. Outer spine longer and broader than the inner; its sides subparallel from base to apical division, which is short and acute, or weakly incurved at middle; edge of apical portion usually finely crenulate. Inner spine of similar shape to that of the outer or with sides sometimes converging from base to apical portion.

Length 7—10 mm.

This species is very distinct from any previously known. It is aberrant in a number of features, such as the large single ocellus and the broad basal spines of the female gonopods. It is the largest known species, and the one farthest from what seems to be the centre of distribution for the genus. The process on the penult legs of the male is much like that of *virginiensis*; but *michiganensis* differs clearly from that species in its much greater length, which is about twice that of *virginiensis*, in the spining of the legs, and in the form of the basal spines of the female gonopods. *N. fungifuopes*, the species that has been taken geographically nearest to it (Western New York), is readily separable from it, as from all others now known, in lacking dorsal spines on the posterior legs; also the form of the process on the penult legs of the male is distinctly different.

Many specimens of this species were taken.

Class DIPLOPODA.

7. *Polyzonium rosalbum* (Cope).

One specimen.

8. *Spirobolus marginatus* (Say).

One adult and one immature specimen. A widespread form.

9. *Parajulus venustus* (Wood).

A form common in the region. Three specimens.

10. *Parajulus canadensis* (Newport).

A species common in the North-Eastern States and Canada. Six specimens.

11. *Parajulus*, sp. Jr.

Two very young specimens of uncertain species.

12. *Parajulus dux*, sp. nov.

General colour brown, often very light. A distinct longitudinal median dorsal black line which is commonly interrupted. The usual series of black spots over the repugnatorial glands, but each spot embracing one or more light areas, and so often inconspicuous. A dark transverse line across dorsum and connecting the two lateral spots of each segment. Also below the spots a dark line or band is more or less developed; this band is areolated with light spots and is often inconspicuous or scarcely evident. A broad black band across anterior border of first plate, anal scutum often blackish. Eyes black. Antennæ dusky brown to black, the distal article commonly pale. A solid black band between antennæ with a light spot in each end near antennæ. Vertex marked with close network of coarse dark lines. Lower part of head dusky, more or less areolated with light dots, a larger light area below each antennæ and along labial margin, above which and ectad of lateral light areas there is commonly a dark band.

Sulcus of vertex fine, ending near upper level of eyes. A deep setigerous foveola on each side of anterior end of the sulcus, the female sometimes more or less extended laterad.

Eyes large, subtriangular, but the sides convex. Ocelli mostly between 42 and 52 in 7 to 9 transverse series, e.g.:

7, 7, 7, 6, 6, 5, 3, 1; 9, 9, 8, 7, 6, 5, 3, 1.

First dorsal plate with lateral border rounded, not at all angularly produced. Distinctly but not strongly margined. Two striæ across lateral ends and a number of less deep short ones above these across caudal border.

Second segment deeply striate ventrally and over lower portion of sides, the striæ well separated above, but closer together

ventrally. Succeeding segments also similarly deeply striate, the striae coarse and well separated above, nearer together ventrally, not occurring above level of dark repugnatorial areas.

Repugnatorial pore small, in most segments a considerable distance removed from the suture, which at its level is straight or only slightly and broadly excurved.

Anal tergite with tip acute and spinous, clearly exceeding the valves, distally weakly and evenly decurved, but by no means so strongly or angularly as in *canadensis*.

Anal valves not mesally distinctly margined, at most broadly somewhat raised, the border crossed by transverse striae.

Anal scale with caudal margin widely convex; mesally slightly indented.

Mandibular stipes in male concavely excavated; produced caudad below the excavation.

Promentum of gnathochilarium in male much enlarged as usual; elliptic in outline.

First legs in male strongly enlarged as usual; uncinat; penult article conspicuously crassate proximally, though less so than preceding article, and narrowing much distad, its inner side nearly straight.

Second legs of male with coxae much enlarged and produced mesally into a long linguiform process, which is broadest proximally and narrows distad, though widening a little at very end, which is truncate. Legs reduced as usual.

Anterior division of first gonopods of male broad, clavate, distally rounded, in lateral view concealing wholly, or nearly so, the caudal division, which is somewhat shorter than the anterior and narrows strongly distad except at tip, where it enlarges again a little and is distally subtruncate.

Posterior gonopods in ventral view almost concealed by the first, above which they do not rise. Each curves mesad near level of distal end of first gonopods and then proximad. A semi-membranous pointed blade-like branch arising from base and a little surpassing posterior branch of first gonopods.

Number of segments 44, or near that number.

Length: 25—32 mm.

In the general superficial appearance of the gonopods this species resembles *P. canadensis*; but the posterior division of the

first gonopods is shorter and is distally truncate, while the second gonopods are more decidedly different. *Canadensis* is a darker species which may be at once distinguished in both sexes from the present one by the much longer and more strongly and abruptly decurved spinous tip to the anal scutum. The wide separation of the small repugnatorial pore from the suture is a characteristic of importance.

This species is represented in the collection by numerous specimens.

13. ***Polydesmus serratus*** Say.

Polydesmus canadensis Newport.

This common *Polydesmus* is represented by numerous specimens.

14. ***Branneria carinatum*** Bollman.

Two specimens; the first to be added to the few specimens in the collection of the author of the species.

SOME NOTES ON PARASITISM OF CHRYSOPIDS IN SOUTH CAROLINA.

BY E. A. MCGREGOR,

Bureau of Entomology, Washington, D. C.

In 1890 Dr. Howard published notes on "The Parasites of the Hemerobiinae."* In this article the author records *Telenomus* sp. as an egg parasite of "either *Chrysopa* or *Hemerobius*." As secondary parasites reared from larvæ or cocoons, † he mentions *Hemiteles hemerobiicola* Ashm., *H. rufiventris* Riley and *Mesochorus* (?) *chrysopæ* Ashm. At that time Doctor Howard prophesied that several species of the proctotrupid *Helorus* would eventually be found to be primary parasites of Chrysopids. This prediction has been substantiated by the present writer's work. Moreover, the two rearings of *Isodromus iceryæ* at Batesburg, as indicated in Table II, add additional proof to Dr. Howard's

*Proc. Ent. Soc. of Wash., Vol. II, pp. 123-124.

†Since first preparing this paper on Chrysopid parasites, all of which had been bred from cocoons, we have been able to conduct some observations on Chrysopid eggs. In all 93 eggs were collected, and from these were bred 7 parasites—all of the species *Telenomus chrysopæ* Ashm. Computed on the basis of 7 parasitized eggs out of 93, an estimated egg parasitism of 7.5% is found to obtain. The total parasitism, then, from species issuing from the egg (7.5%), and from species issuing from the cocoon (48.4%), is computed to be about 55.9%.